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ABSTRACT

This paper examines issues in establishing an initial social/communicative repertoire with individuals who have severe to profound disabilities, with emphasis on intervention involving the most severely affected. The paper stresses the importance of beginning intervention efforts even before learners show intentional behavior and discrimination of environmental stimuli, and examines the importance of focusing on pragmatics and the interaction process. Increased availability of augmentative and alternative communicative options is seen as increasing the potential for full inclusion of people with severe disabilities in the mainstream. The paper also discusses: communication as social behavior, intentional communicative behavior, evaluating the efficiency of various communicative forms, full utilization of naturally occurring interactive contexts, teaching communicative forms and functions, modification of elements of environments to ensure communicative attempts, collaborative service delivery, and addressing the differences and similarities between home and school. An appendix compares taxonomies describing instrumental communicative intents. Attached are lists of 72 references, 13 books and monographs, 6 products, 8 journals/newsletters, 6 organizations, and 47 federally funded projects. (DB)

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Communication Intervention for Persons with Severe and Profound Disabilities: An Overview

by
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This paper examines important issues in establishing an initial social / communicative repertoire among individuals who have severe to profound disabilities.[1] *The discussion is intended for interventionists working primarily with individuals who have not yet displayed an overt interest in or who are not yet able to discriminate among the environmental stimuli that surround them. Strategies are also presented for working with individuals who display an interest in their environment but who use highly idiosyncractic means to express themselves. A thorough review of communicative behavior and communication interventions is presented.*

INTRODUCTION

Thompson and Guess (1989) have described learners with the most profound disabilities as having characteristics that include limited awareness, limited response repertoires, no communication systems, and, often, medical complications. They go on to observe that teachers view learners with the most profound disabilities as a distinct group within a population that is generally viewed as having severe and multiple disabilities.

Unlike most learners who readily demonstrate a propensity to voluntarily act on aspects of their environment or react to the actions taken by others, persons with profound disabilities often do neither. Consequently, the task for the communication interventionist often must begin with identifying those stimuli that are apt to result in a reaction from the learner. In those reactions lie the topographies that the interventionist can attempt to prompt and shape into actions that may serve the learner communicatively.

The focus of this paper is to examine the establishment of an initial social/communicative repertoire among individuals who have severe to profound disabilities. Our discussion will focus on individuals who have not yet displayed an

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overt interest in or who are not yet able to discriminate among the environmental stimuli that surround them. Additionally, we will focus on individuals who have displayed an interest but are using highly idiosyncratic strategies to express themselves.

According to the National Joint Committee for the Communicative Needs of Persons With Severe Disabilities (1992), current best practices in the establishment and enhancement of communication among individuals with very severe disabilities should be based on six major tenets. These are that:

1. communication is social behavior;
2. communication acts can be produced in a variety of modes;
3. appropriate communication functions enable productive participation in interactions with others;
4. effective intervention must modify the physical and social elements of environments to ensure that the environments invite, accept, and respond to communicative acts;
5. effective communication intervention must fully utilize naturally occurring interactive contexts; and
6. service delivery must involve family members working collaboratively with a cadre of professionals and paraprofessionals.

This paper appears in L. Küpper (Ed.), *The Second National Symposium on Effective Communication for Children and Youth with Severe Disabilities: Topic papers, reader's guide & videotape.* McLean, VA: Interstate Research Associates.

The discussion of communication intervention in this paper will be framed to address these important tenets.

COMMUNICATION AS SOCIAL BEHAVIOR

The National Joint Committee for the Communicative Needs of Persons with Severe Disabilities (1992) has defined communication as:

> ...any act by which one person gives to or receives from another person information about that person's needs, desires, perceptions, knowledge or affective states. Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or nonlinguistic forms and may occur through spoken or other modes. (p. 2)

This definition provides the starting place for our examination of communicative acts and the social participation of individuals with severe disabilities. (See Appendix A in this volume for the complete text of the National Joint Committee's guidelines.)

Describing the Range of Social Participation Among Persons with Severe Disabilities

Individuals with the most severe communicative deficits are distributed across a continuum of great breadth with respect to their propensity to socially interact. On one extreme are those indi-

viduals with severe disabilities who are very active socially. These individuals may have substantial behavioral repertoires that are aimed at obtaining/maintaining attention, obtaining desired activities, and escaping/avoiding undesired activities. For some of these individuals, the form of this social behavior will consist of challenging behaviors that may include, but not be limited to, tantrums, aggression, property destruction, and self-injury (Durand, this volume; Reichle & Wacker, in press). Other individuals will have a significant repertoire of social skills that may include the emission of an array of gestures. These gestural repertoires may range from natural, readily understood gestures (e.g., waving, pointing, or offering a cup) to more idiosyncratic forms that can only be understood by individuals who are intimately familiar with the learner and who have learned to decipher that person's consistently-used, gestural repertoire. Still other individuals appear to have very little interest in engaging in social interactions. Reichle, York, and Eynon (1989) have referred to many of these individuals as appearing to be passive participants in the milieu of social environments. Plausible explanations for why these individuals have become passive participants include: (a) they have interaction strategies, but they simply choose not to use them; (b) they have learned to refrain from social contact as a result of learned helplessness (Seligman, 1975); (c) social contact represents an aversive event, and this results in the active avoidance of or escape from social interactions; (d) they have limitations in their ability to discriminate and react to social stimuli; or (e) they have limitations in their ability to remain sufficiently alert to the social environment (Guess, Siegel-Causey, et al., 1990).

Operationalizing the Purpose and Flow of Early Social Exchanges

Interestingly, acquiring a propensity to socially interact does not appear to require significant developmental prerequisites. Infants appear to attend to adults very shortly after birth. For example, the caregiver's voice has been demonstrated to serve as a discriminative stimulus for a five week old infant's smiles (Wolff, 1963). Some regularly occurring events (e.g., feedings) provide an opportunity for a learner to begin associating the presence of familiar individuals with the delivery of social attention, as well as both desired and undesired objects/events. Still other instances of early social interactions seem less episodic and are geared to establishing and maintaining a proto-conversation between learner and teacher (or caregiver). In these instances, the learner may or may not be interacting intentionally. Table 1 displays a variety of child behaviors that are interpreted by adult listeners as being socially responsive. These initial social overtures (even though not yet intentional) have spawned a plethora of investigatory efforts to describe early, expressed social intent and its influence on the environment.

Table 1

Child Behaviors that may be Interpreted as Socially Responsive by Their Listeners

Learner Behavior	Caregiver's Perception of the Child's Behavior	Actual Occurrence
As mother enters the room, her three week old infant looks at her and smiles.	Mother interprets the infant's smiling as an expression of pleasure as a result of his mother's arrival. Based on this, the mother goes to the child and begins to verbally interact with him.	In actuality, infants at this age do not yet use their smiling response discriminitively (Wolff, 1963). For example, it is likely that the infant would have responded in the same manner if a stranger had entered the room.
Upon dropping a toy from his highchair, an eight month old infant reaches for the toy and vocalizes.	The infant's father interprets these behaviors as a request and responds by saying, "OK, Daddy will get your toy for you."	It is not until after approximately ten months of age that infants use a combination of vocalizations, gestures, and eye contact to convey requests. Based on this, it is probable that the infant would have emitted the same behaviors had the father not been present (Bates et al., 1975; Bruner, 1975).
When the bottle falls from his mouth, interrupting his meal, a two week old infant begins to cry.	The infant's cry is perceived by his mother as a request for assistance. She responds by saying, "OK, I'll get your bottle for you" and she places the bottle in his mouth.	At two weeks of age, infants respond consistently to an interruption of feeding by crying. Although the mother was present on this occasion, the infant would have emitted the same response had she been absent (Wolff, 1969).
Thirty minutes after finishing a bottle, an infant starts to cry.	Upon hearing the cry, the mother goes to him and checks his diaper. Finding the diaper wet, she perceives the infant's crying behavior as a way of communicating that he is uncomfortable.	Although the mother interpreted the cry as a communicative response, it is probable the diaper was wet long before the crying behavior was emitted (Wolff, 1969).

Describing Intentional Communicative Behavior

The examples presented in the preceding section suggest that parents and caregivers readily interpret very young children's production of discrete voluntary behavior as communicative, even though the actions may not have been emitted intentionally (see Halle, this volume). Most researchers agree that normally developing infants become intentional around eight months of age. Wetherby and Prizant (1990) described a number of criteria that may be useful in determining the point at which a learner is emitting discrete voluntary behavior with communicative intent. Criteria include:

1. alternating eye gaze between a goal and one's listener,
2. persistence in the production of a behavior until a goal has been met,
3. pauses between emissions (waiting for a response),
4. termination of a behavioral emission once a goal has been met, and
5. altering a behavior when it is not at first successful in procuring the goal.

Traditionally, communication interventionists have viewed intentional behavior as a precursor to communicative instruction. Increasingly, however, interventionists are attending less to specific cognitive prerequisites to communication intervention. Rice (1983) stated that "there is a detectable sense of frustration regarding the elusiveness of cognition and its role in language impairment and the remediation process" (p. 347). An increasingly prevailing view is that specific voluntary behaviors emitted by the learner should be consequated systematically by the interventionist with a desired outcome that, over time, may come to be associated with the voluntary behavior produced. For example, loud vocalizing that occurs after a learner has consumed a beverage may be consequated by a refill of beverage. Even though the initial emissions of the vocalizations were not intended for an audience, the learner, across consistently consequated responses, may come to learn that loud vocalizations at mealtime tend to recruit offers of food. It is reasonable to assume that parents, caregivers, and teachers who (a) most accurately interpret the environmental conditions that precipitate motor and vocal emissions and (b) consequate learner emissions immediately may be the most efficient instructors of an initial communicative repertoire.

Currently, there are no available data to suggest that intentionality represents a prerequisite for beginning communication instruction. At the same time, however, it is important that the interventionist place himself or herself in a position to discern the learner's initial emission of intentional behavior. At this point, increasing emphasis can be placed on shaping communicative productions into forms that will be more user-friendly to the learner's listener.

Unfortunately, selecting initial communicative forms to teach is complicated by the limited repertoire of vocal and motor behavior that the learner brings to the language learning task. Whether the goal of the interventionist's activities is to establish comprehension or production of communicative behavior, it is impera-

tive that he or she identify discrete voluntary behavior emitted by the learner that can be shaped or prompted into socially acceptable communicative forms. These forms may involve gestures, vocalizations, selection of graphic representations, or a combination of responses within these modes.

COMMUNICATION ACTS CAN BE PRODUCED IN A VARIETY OF MODES

Guess, Siegel-Causey, et al. (1990) suggest that, once a learner with severe/profound disabilities emits intentional behavior, expansion of that individual's communicative repertoire is limited by the number of easily emitted, socially acceptable behaviors that can be shaped or prompted. Mirenda and Calculator (this volume) address the range of augmentative and alternative communication systems that can serve individuals with severe disabilities. It is particularly important that, prior to making decisions about establishing new communication forms, the interventionist recognize any existing communication strategies emitted by the learner.

Identifying Learner Responses

Most learners engage in some discrete voluntary behavior. Sometimes, movements associated with state changes become the initial forms that interventionists attempt to establish as responses to certain environmental events. For example, an interesting visual spectacle in the presence of a quiet but alert learner may result in increased body movement. Conversely, a soft sound presented to an alert and active learner may result in a marked decrement in movement. Initially, then, many learners with profound disabilities may display generalized reactive responses to adults' social overtures.

A learner who has a limited repertoire of voluntary responses presents a formidable challenge for locating functional actions that can be used communicatively. Piche and Reichle (1991) have described some characteristics of signaling response which the interventionist may wish to consider. They observe that voluntary responses already produced frequently and that are part of a socially unacceptable repertoire should be avoided. Responses involving the controlled use of an undesired reflex or movement pattern should also be avoided, if possible. Third, if possible, movement that can be prompted should be selected. Finally, it is important to locate a behavior that, when produced, does not readily fatigue the learner.

Once a learner's experience with a particular social routine increases, he or she may begin developing individualized responses that correspond to the particular routine of interest. For example, when a mother slowly produces a noise-making toy from behind her back, a child may quiet. Once the toy is placed in the learner's hand, he may come to learn that it produces the most noise when shaken. If the learner finds this activity to be enjoyable, he may come to anticipate its delivery by engaging in the shaking action just prior to the item's arrival. This more explicit gesture, eventually used as a

request, would provide the interventionist with more explicit information about the learner's preference than would a highly general action such as smiling.

Deciding to Alter an Existing Repertoire

Communicative emissions may involve natural gestures that will be quite guessable to their communicative partner. Reichle, Halle, and Johnston (1993) suggest that establishing more sophisticated communicative forms for the sake of making the learner's repertoire "more sophisticated" may not be warranted. However, shaping or replacing communicative emissions may be warranted in some instances. Included among these are instances when: (a) the learner's communicative productions are so idiosyncratic that they require the listener to be familiar with their function in order to be understood; (b) the learner produces communicative behavior that is easily understood but socially unacceptable (e.g., holding one's crotch to inform a communicative partner that one needs to go to the bathroom); or (c) the learner's communicative productions are harmful to the learner or to others (e.g., aggression, self-injury, tantrums, property damage, etc.).

In all of the preceding examples, the interventionist must make decisions about how best to establish a beginning communication system and to what degree it will be integrated with the learner's existing communicative repertoire. For learners with a very limited communicative repertoire, there is a tendency for professionals to avoid having to make a decision about replacing an existing communicative repertoire. We believe that replacing existing communicative forms should be based on criteria that address the social acceptability and efficiency of the communicative forms that the learner produces at the outset of intervention. The disadvantage to this belief is that the longer the interventionist waits to replace an old form of behavior, the more difficult replacement may become. That is, the better maintained and generalized a response, the more difficult it may be to replace. In the following section, we will consider intervention strategies that relate directly to demonstrating the efficiency of a new communicative repertoire to the learner.

Considering the Efficiency of Communicative Forms

Typically, interventionists have presumed that if learners are sufficiently motivated to obtain an outcome, they will engage in communication even though the emission of conventional communicative behavior requires substantial effort. Unfortunately, for some learners, the cost of responding may be too great and may override the reinforcing event or reaction from a partner, which will occur contingent on communicative emission. Even when learners acquire a new communicative form, the inefficiency of this form may result in its failure to be maintained or generalized.

Recently, a number of investigators have become increasingly interested in the efficiency of communicative behavior being established (Horner & Day, 1991; Mace & Roberts, in press; Reichle & Wacker, in press). Mace and Roberts (in

press) describe four criteria that address the relative efficiency of competing responses that achieve the same outcome. These include: (a) the rate of reinforcement, (b) the immediacy of reinforcement, (c) the response effort, and (d) the quality of reinforcement. For example, assume that a learner currently requests a soft drink by standing beside the refrigerator and tapping the door. An alternative communicative form might be to touch a symbol consisting of a miniaturized Diet Coke logo that has been affixed to the refrigerator door. Briefly, we will apply criteria described by Mace and Roberts (in press) to this example.

Rate of Reinforcement

Suppose that a female learner received the same reinforcer, Coca-Cola, regardless of whether she tapped the refrigerator or touched the product logo. That is, the learner's interventionist reinforced the new communicative behavior but also continued to supply the same consequences for the emission of the old behavior. In this instance, no advantage would be gained by using the new symbol. On the other hand, the rule could be applied that tapping on the refrigerator would no longer result in obtaining Coca-Colas. By adding this contingency, a clear advantage would result for use of the new logo. In other words, deciding not to reinforce the continued emission of the learner's old behavior makes the advantage of engaging in the new behavior more discriminable.

Immediacy of Reinforcement

When a learner uses more idiosyncratic behaviors to communicate, it is often necessary for the listener to spend a significant amount of time guessing what it was that the learner wanted. For example, when a learner taps a refrigerator, she might want a Coke, cheese, or any one of numerous other objects. Consequently, idiosyncratic requesting behavior may delay the delivery of the desired item. On the other hand, if the learner touches an explicit symbol representing the desired item, delays in obtaining the desired consequence may be minimized.

Response Effort

In our example, the effort required to emit the target response is virtually identical for each of the two options. Of course, as new product logos are added to the array, the discriminative demand on the learner correspondingly increases. Consequently, with learners who have severe disabilities and clear boundaries of the response effort they are willing to exert, it is important to make the acquisition of other new symbols (competing stimuli) as error-free and effortless as possible for the learner.

Quality of Reinforcement

Once the learner begins to touch a logo representing a desired beverage, she may be apt to use it even though there is no refrigerator nearby. This, in turn, may result in some requests that are conse-

quated by her listener providing some alternative beverage in place of the requested Diet Coke. If this occurs often enough, the learner may conclude that tapping the refrigerator obtains a better quality of reinforcer.

Response Efficiency From the Listener's Perspective

Thus far, we have considered the efficiency of communicative forms from the learner's perspective (e.g., rate of reinforcement, immediacy of reinforcement, response effort, quality of reinforcement). However, it is equally important to consider the efficiency of a learner's communicative forms from the *listener's* perspective.

Some communicative forms may be relatively efficient from the perspective of the learner but highly inefficient from the perspective of the listener. Often, those who spend a substantial amount of time with a learner actually "learn" his or her idiosyncratic communication strategies. Although this may work well with these individuals, it may significantly limit the degree to which the learner can communicate independently across a range of community environments. Assuming that the learner's idiosyncratic communicative strategies are socially acceptable, it may be most efficient for the learner to use those strategies with familiar listeners but learn more conventional communicative strategies to use in other environments.

At first glance, the preceding suggestion may seem somewhat complicated. However, many learners with very idiosyncratic communication strategies already use several different behaviors to achieve the same outcome. For example, if a parent tosses a package of dried fruit or pretzels near the learner and they are within her grasp, a probable response would be to pick up the treat and eat it. On the other hand, suppose the learner sees her mother give a package to a peer, but the mother does not offer a package to the learner. This condition may be likely to result in a request for the treat. There is a growing literature that addresses the most efficient intervention strategies to use in establishing this "conditional" use of new communicative repertoires (see Reichle, York, & Sigafoos, 1991).

Usually, one assumes that establishing communicative behavior lessens the probability of learned helplessness (Guess, Benson, & Siegel-Causey, 1985). However, some vocabulary that may need to be emitted in some settings to access events independently may foster helplessness if emitted in other settings. For example, at school a learner may have to request something to drink. At home, however, the learner could simply go to the refrigerator and select a beverage any time he or she was thirsty. In this latter instance, the emission of communicative behavior actually results in the learner being more dependent on others who share his or her environment. It is important that interventionists not only take great care in identifying a communicative repertoire to teach, but also take care to ensure that use of the communicative repertoire they are selecting will result in greater rather than diminished social independence for the learner.

The preceding discussion suggests that establishing a functional and efficient communicative repertoire is very difficult to accomplish if the interventionist designs and implements intervention procedures in the absence of those environments in which the behavior is expected to be utilized, once acquired.

EFFECTIVE COMMUNICATION INTERVENTION MUST FULLY UTILIZE NATURALLY OCCURRING INTERACTIVE CONTEXTS

The bulk of communication intervention programs developed for persons with severe disabilities during the 1970s used a didactic instructional format and focused on establishing vocal mode communication skills. This format often resulted in interventions that used a narrow range of teaching examples that were implemented outside the environments in which the skills being taught were expected to be used. Typically, instruction was implemented by a single interventionist during episodes of massed teaching opportunities. Often, these practices resulted in establishing communicative repertoires that were poorly maintained and not extensively generalized.

As our knowledge of communication intervention has grown, so, too, has our fine tuning of the design of intervention formats. Within the past decade, increasing emphasis has been placed on instructional strategies that provide sufficient teaching examples under the most naturalistic circumstances possible. The challenge currently facing the communication interventionist is to establish discriminative and generalized use of a communicative repertoire without sacrificing the milieu of natural opportunities to teach and stimulate language. In the discussion that follows, we will explore best procedural practices that attempt to address this challenge.

Identifying the Repertoire to be Taught

Describing a Range of Communicative Functions

A number of investigators have developed taxonomies to describe instrumental communicative intents (Cirrin & Rowland, 1985; Dore, 1975; Wetherby & Prizant, 1992). Instrumental intents describe *why* the learner produced a particular utterance, regardless of where it occurred within the flow of an interaction. Five taxonomies are compared in Attachment A, which appears immediately following the references and resources at the end of this article. This comparison illustrates the similarities and differences among current descriptive strategies that are used to describe communicative functions. These functions represent the building blocks used in communicative exchanges that comprise simple conversations.

Distinguishing Between Pragmatic Functions and Social Functions

Given the numerous descriptive taxonomies available to the prospective interventionist, describing the reason for

the production of any given utterance would seem to be a relatively straightforward proposition. However, we believe it is easy to misuse pragmatic taxonomies to describe communicative *forms* rather than *functions*. For example, consider a learner who is grudgingly engaging in work. Approximately one minute into the task, the learner signals for "help." Her mother dutifully assists her with the first chore. Several minutes later, the learner is again requesting assistance. After 10 requests, her work has been completed without engaging in any work other than requesting assistance. Most pragmatic taxonomies would describe the learner's behavior as a series of "requests for assistance" or "requests for action," based on the utterance form and the specific context in which it was emitted.

Alternatively, a functional assessment of the situation might suggest that the learner's communicative behavior functioned to avoid or escape engagement in the activity. A request for assistance, in some instances, may serve as a strategy to access a highly preferred item (e.g., obtaining assistance to unwrap a desired piece of candy). On other occasions, requests for assistance may be produced in an attempt to escape from an unpleasant chore. Unless the full range of relevant stimulus conditions is addressed during intervention, the interventionist cannot conclude that the learner will generalize the pragmatic function being taught across the complete range of environmental circumstances in which the pragmatic function can be used. Reichle (1990b) reports instances in which teaching a learner to "request assistance" exclusively in the presence of opportunities to escape or avoid highly nonpreferred activities failed to generalize to the use of "request assistance" vocabulary to access desired objects and events (e.g., candy that the learner needed help unwrapping). Reichle (1990b) also reports an instance in which a learner with severe developmental disabilities was taught a general rejecting gesture ("no"). All of the identified teaching opportunities occurred when the learner was offered a highly *nonpreferred* object or event. Over time, the learner used a rejecting utterance whenever an undesired item was offered. One of this individual's preferred activities was traveling to a coffee shop on Saturday morning to partake of a beverage and sweet rolls. Generalization probes conducted in this setting demonstrated that the reject gesture had generalized to previously untrained and undesired breakfast items. For example, when offered bacon or sausage (highly nonpreferred items), the learner emitted his rejecting response. However, when offered refills of juice (a highly preferred item) for which he had demonstrated satiation, the learner failed to emit his newly-established rejecting utterance. As the intervention process proceeded, it became increasingly clear that, inadvertently, the interventionists had taught the learner to use a rejecting gesture across only a subset of the full range of important functional opportunities for its use. Unless interventionists match the pragmatic function being taught with a full *range* of social functions that the new utterance is expected to serve, it may be very difficult to

establish a truly generalized communicative repertoire.

Describing General Conversational Functions

Generally speaking, during a communicative exchange, three things can happen. The interaction can be initiated, maintained, or terminated. In considering functional social/communicative use, it is critical that the interventionist consider establishing instrumental communicative functions such as requesting, rejecting, and commenting. Equally critical, however, is the importance of considering how instrumental communicative functions can be used across conversational functions (i.e., initiate, maintain, and terminate). Table 2 displays examples of interactions between instrumental communicative functions and conversational functions.

Describing early communicative behavior can be particularly difficult in the case of the idiosyncratic emissions of individuals with severe and profound disabilities. Often, with beginning communicators, the interventionist's task starts with determining whether learners already understand that their vocal and gestural emissions can exert control over their environment.

Selecting a Functional Communicative Repertoire

Only recently have interventionists begun to grapple with developing strategies to derive the best and most efficient teaching examples to utilize in the intervention process. Recently, a package of intervention logic referred to as *general case instruction* (Horner, McDonnell, & Bellamy, 1986; Horner, Sprague, & Wilcox, 1982) has received significant discussion as being relevant to the selection and organization of teaching examples.

At the heart of the general case approach is the concept of stimulus control. A general case approach is aimed at helping learners to make appropriate discriminations and respond to stimuli that share common features, and not respond to irrelevant features that may vary across stimuli and settings (Engelmann & Carnine, 1982). Implementing general case instruction requires careful adherence to six basic steps, which include: (a) defining the instructional universe, (b) defining the range of relevant stimuli and response variation within that universe, (c) selecting examples from the instructional universe for use in teaching and probe testing, (d) sequencing teaching examples, (e) teaching the examples, and (f) testing with non-trained probe examples. In order to illustrate each of these steps, Attachment B outlines how each of these would be operationalized in the context of teaching a learner to request a glass of milk by using a graphic symbol representing "milk."

Following the guidelines of general case instruction ensures that generalization is not a post-hoc consideration. Rather, the generalization process is considered during the development of intervention procedures. Although general case instructional procedures have been widely embraced in the special education literature, they have received very limited

Table 2

Interaction Between Communicative Intents and Stages of Communicative Exchanges

		Initiate	Maintain	Terminate
REQUEST	Context	A 6-year-old sees a peer on the playground.	A preschool child is watching his mother blow bubbles.	A learner has lost interest in playing with his younger sibling.
	Utterance	He approaches the peer and says, "Wanna play?"	He says, "Do it again."	He says, "Wouldn't you like to watch cartoons now?"

Note: Adapted from Reichle, J., York, J., and Sigafoos, J. (1991). *Implementing augmentative and alternative communication: Strategies for learners with severe disabilities* (p. 163). Baltimore: Paul H. Brookes. Copyright 1991 by Paul H. Brookes Publishing Company, Inc. Adapted with permission. (Available from Paul H. Brookes Publishing Company, P.O. Box 10624, Baltimore, MD 21285-0624. Telephone: 1-800-638-3775.)

attention in the communication literature. Recently, a number of investigators (Halle, personal communication, May, 1992; Reichle, Halle, & Johnston, 1993) have addressed its applicability to beginning communication instruction. They are finding that, rather than being prescriptive in terms of exact instructional techniques that must be used, a general case approach permits the interventionist great discretion in selecting specific intervention procedures.

Teaching Communicative Forms and Functions

Tannock and Girolametto (1992) have discussed the degree to which intervention strategies are learner-oriented (i.e., follow the learner's lead), interaction-promoting, or language-modeling. Learner-oriented components of communication intervention seek to establish episodes of joint involvement around the child's immediate focus of attention. According to Tannock and Girolametto (1992), their success lies in:

> ...increasing the saliency of information in the child's physical and social environment; tuning its complexity to the child's current level of functioning; providing the kind of input that the child can attend to, process, and assimilate ... (p. 55).

Interactive models of intervention have no specific communication topographies as intervention targets. Additionally, no didactic teaching methods are used. Language-modeling techniques are designed to enable the child to recognize relationships among content, form, and use of language.

Although it is difficult to characterize any particular communication intervention program as adhering universally to one of these orientations, the latter (language-modeling) has been used most extensively with persons with severe communicative deficits and has the most extensive empirical database. By far, the most empirical attention has been given to those aspects of communicative intervention procedures focused on modeling language. Among the most ecologically sensitive of these approaches has been milieu language intervention (Hart & Rogers-Warren, 1978).

Milieu Language Instruction: A Language-Modeling Approach

Hart (1985) described three teaching strategies that encompass the milieu approach to language intervention. These strateiges are: mand-model, time delay, and incidental teaching.

Mand-model instruction. During an episode of mand-model instruction, the interventionist places a variety of items of potential interest within range of the learner. As the learner approaches the material, the interventionist initiates the interaction by producing an utterance that requires the child's response. For example, in a requesting episode, the interventionist might say, "What do you want?" In a commenting episode, the interventionist might ask, "What is that?" If the learner fails to produce the desired

response, the interventionist may follow the original utterance by producing a model for the child to imitate (e.g., "cookies," if the goal of the intervention is the production of single-word utterances). When the learner responds, he or she is praised socially and given access to the materials. In order to benefit from mand-model instruction, it is important that the learner be able to engage in imitation.

Once a learner participates in a mand-modeling procedure, the interventionist is in a position to exert some control over the frequency of communicative output. Unfortunately, because a high proportion of communicative emissions is preceded by the interventionist's verbalizations, spontaneous use of the learner's burgeoning repertoire may not occur readily.

Time-delay instruction. A time-delay instructional procedure is designed to transfer instructional control from the interventionist's mands and models to other naturally occurring environmental stimuli (Hart, 1985). A component of the time-delay procedure includes an adult in close proximity displaying a reinforcing stimuli. The adult remains quiet for a brief interval (Halle, 1982; Oliver & Halle, 1982), providing the learner with an opportunity to initiate the topic. If the learner does not emit a response, the adult provides a model and again awaits a response. The learner is then provided with the reinforcer, whether or not a response is elicited.

Halle, Marshall, and Spradlin (1979) demonstrated the effectiveness of the time-delay process with children who had mental retardation. The interventionist delayed giving the learners their food trays during breakfast and lunch. As a result, the learners' requests for lunch trays increased and generalized across people and mealtimes. Thus, once learners take advantage of more subtle environmental cues, it may become increasingly likely that they, rather than the interventionist, will begin to initiate the teaching opportunity.

Incidental teaching. This type of teaching requires that the interventionist wait for the learner to choose a topic. The learner is then prompted to elaborate on the chosen topic and is supplied with appropriate models when needed. The incidental teaching procedure differs from the mand-model procedure in that the learner, rather than the interventionist, chooses the topic. For example, if a learner approaches an activity and communicates "want paint," the interventionist responds by requesting language elaborations (e.g., "What color of paint would you like?"). If the learner does not respond, the elaborated response may be prompted by the teacher. For example, the teacher may hold up the blue paint and say, "The color of this paint is _____." If the learner still does not respond, the appropriate response may be modeled for the learner to imitate (i.e., "blue paint"). When the learner provides a correct response, it is confirmed (i.e., "That's right, this is blue paint"), and the child is consequated with the reinforcing stimuli.

Although milieu language instruction offers the distinct advantage of capitalizing on the same interactional

strategies that have been documented to occur between parents and their normally developing children, there are some limitations of the model when applied to learners with very severe disabilities. First, as it was originally presented, mand-model instruction is efficient when recipients engage in an imitative repertoire. However, if a learner cannot act on an imitative model, the interventionist must develop an intervention strategy to teach the learner to use the model. Secondly, there is a limited database available that addresses the generalizability and maintenance of communicative skills taught (Kaiser, Yoder, & Keetz, 1992). Thirdly, the bulk of successful applications of milieu intervention has focused on populations that include disadvantaged preschoolers, learners with specific language delay, and learners with autism. Significantly less empirical demonstrations have been conducted with persons who have more severe disabilities (Halle, Marshall, & Spradlin, 1979; Warren, McQuarter, & Rogers-Warren, 1984).

Interactive-Based Intervention Approaches

With the increasing emphasis on conversation and interaction in beginning communicative exchanges, interactive intervention strategies have become increasingly popular among interventionists who do not want to focus on specific forms of communicative behavior to be taught. Although Tannock and Girolametto (1992) have observed that "...the precise mechanisms by which early social interaction facilitates language development are not known..." (p. 53), current research and best practice suggest that particular aspects of the learner's communicative partner's behavior influence the learner's acquisition of communicative skills. Reichle, Halle, and Johnston (1993) summarize these aspects as including:

1. the maintenance of joint attention (i.e., participants in the interaction are attending to the same aspect of the environment);
2. the contingent response to the child's communicative effort (i.e., the partner's response immediately follows and is related to the child's communicative attempt);
3. the use of joint activity routines;
4. the use of models and/or expansions of learner utterances; and
5. the modification of speech to match the complexity of the child's communicative production.

A number of existing communication curricula rely heavily on social interaction as the underpinning of the communication intervention process (e.g., MacDonald, 1989). Consequently, addressing how learners with severe disabilities come to participate productively in social/communicative exchanges warrants discussion.

As mentioned earlier, social exchanges between communicative partners can be initiated, maintained, or terminated. These three broad classes interact with communicative functions that have been described previously in this paper. That is, a request can be used to fulfill each of the three conversational

functions, as depicted in Table 2. There is little evidence suggesting that, once a specific communicative function has been acquired (e.g., rejecting, commenting), it generalizes across the conversational boundaries of initiate, maintain, or terminate. Briefly, we will examine the three conversational components as they apply to the earliest phases of communication intervention.

Maintaining communicative interactions. In order to react to and subsequently maintain a social interaction, it is important that the learner be able to attend to referents that are being spoken about by his or her listener. Additionally, it is important that the learner be able to coordinate attention between his or her listener and the referents of the interaction. These competencies require that the learner exhibit a repertoire of orienting responses. Examples of these responses include joint focus, line of regard, and following natural gestural directions.

In the context of a social exchange, *joint focus* refers to both participants directing their attention simultaneously to the same referent. At the most rudimentary level, visual and/or auditory localization responses greatly facilitate establishing joint focus. For example, if the interventionist wishes to call a learner's attention to an object, tapping the item or walking over to the item will generally result in the learner's localization (Kaye, 1976; Scaife & Bruner, 1975).

Line of regard occurs when the learner's listener directs his or her gaze to a particular place; the learner may subsequently look in the same direction of the listener, even though there was no overt cue to do so. For example, while smiling at an infant, the mother looks out the window. Even though nothing may have happened outside, learners older than several months of age will demonstrate a propensity to follow their partner's gaze. Line of regard is viewed as a particularly important advancement in ensuring that learners and their communicative partners establish joint focus on the objects or events that are the focus of communicative exchanges. Typically, learners who engage in line of regard require far less intrusive prompts to visually sample their environment than do learners who do not yet engage in this skill.

Sometimes, a communicative partner alters his or her focus of attention to a cluster of possible referents. Clarifying which referent is the new focus of attention may require pointing to the item or event of interest. For example, while reading a book with a child, parents may point to a particular aspect of the page they may wish their child to notice. This strategy of focusing a child's attention appears to be very effective at relatively early ages in normal developing children (Murphy & Messer, 1977). For individuals with the most severe communicative deficits, the pointing gesture represents an important strategy that the interventionist can use to focus a learner's attention without interrupting the flow of an interaction.

The behaviors that we have described thus far are aimed at teaching the learner to follow, anticipate, and participate in the flow of social routines. McLean and Snyder-McLean (1988) have outlined the characteristics of maximally

efficient social routines that focus on joint action. They suggest that a routine must have some unifying theme or purpose that requires both joint focus between the learner and the listener and an exchange of turns. To maximize the probability that each team member acquires a role in the game, actions should be based on a predictable sequence, with pauses that promote turn-taking. Routines must be ones that can be implemented frequently across time.

Once learners are particularly active in joint activity routines, steps can be taken to identify those components of the listener's behavior which ensure the learner's participation. Table 3 contains an example of how an interventionist might isolate exactly which adult motor and vocal gestures result in a child recognizing that he or she has an opportunity to play a game of peek-a-boo. In this example, it is clear that the interventionist's production of the spoken utterance "peek-a-boo" did not exert any control over the learner's behavior.

Often, learners with more severe disabilities have difficulty learning to understand spoken words. Joint activity routines may provide an opportunity for the interventionist to determine the degree to which the learner attends to the spoken utterances of his or her partner. The interventionist might select a routine that involves the interventionist producing both motor and vocal behavior. During the initial phases of implementing this routine, motor and vocal behavior will be paired. After extensive pairing, the interventionist may choose to deliver the spoken cue just prior to the delivery of the gestural cue. This would afford the learner an opportunity to engage in a discriminative voluntary behavior that previously was under the control of only a gestural cue. Across successful teaching opportunities, the interval between the delivery of the verbal cue and the gestural cue would be increased.

If the preceding strategy were successful, it may still be unclear whether the learner actually understands the spoken word. Instead, the learner may be attending to prosodic aspects (i.e., pitch, loudness, duration) of the communicative partner's utterance. For example, Reichle, Rettie, and Siegel (1986) reported that some preschoolers with Down syndrome were more apt to attend to aspects of prosody (pitch, loudness, duration) than to the specific segmental forms of utterances. The strategy just described could be used to transfer instructional control from the pitch, duration, and loudness of another's utterance to the actual word spoken. It is clear that children learn to attend to and utilize clusters of contextual cues that, as a package, serve as a discriminative stimulus for a social response. With learners who have very severe communication deficits, it may be very important to determine whether they contingently act on social stimuli. If they do, efforts can be made to determine whether their partner's vocal behavior is a salient aspect of that discriminative stimulus. Once a learner produces contingent social responses to vocal stimuli, steps can be taken to teach him or her to discriminate between words spoken by a communicative partner.

Initiating a communicative interaction. Table 4 summarizes some circum-

Table 3

Determining Which Components of a "Peek-a-Boo" Routine Exert Stimulus Control Over a Learner's Response

Natural Occurrence	Trial 1	Trial 2
Partner Behavior: - approach child in typical setting	*Partner Behavior:* - approach child in typical setting	*Partner Behavior:* - approach child in typical setting
- smile	- smile	- smile
- raise hands to eyes and then quickly pull hands away from eyes		- raise hands to eyes and then quickly pull hands away from eyes
- say "peek-a-boo"	- say "peek-a-boo"	
Child Behavior: - Put hands over own eyes	*Child Behavior:* - no response	*Child Behavior:* - put hands over own eyes

Table 4

Circumstances That Occasion Communicative Initiations

Circumstance	Example
Joining activities that are already in progress	Tom Sawyer instills an interest among his peers in painting a fence.
Beginning well-established routines	Upon receiving several cookies, a learner (taught that you can't eat your snack unless all the children in the group have some) turns to a peer who doesn't have any, offers her a cookie, and says, "Here."
Calling attention to novel events	At snacktime, when a child spills his milk, a learner obtains the teacher's attention to point out what has happened.
Protesting the undesirable actions of another	A waiter, assuming that a customer has finished her meal, attempts to remove the plate that still contains a small amount of food. When this happens, the customer says, "I'm not done."

Note: From Reichle, J., York, J., and Sigafoos, J. (1991). *Implementing augmentative and alternative communication: Strategies for learners with severe disabilities* (p. 147). Baltimore: Paul H. Brookes. Copyright 1991 by Paul H. Brookes Publishing Company, Inc. Reprinted with permission. (Available from Paul H. Brookes Publishing Company, P.O. Box 10624, Baltimore, MD 21285-0624. Telephone: 1-800-638-3775.)

stances that appear to occasion communicative initiations. Rarely has initiating been the focus of early intervention efforts with persons having severe developmental disabilities. Usually, initiation is addressed once the learner has acquired a new vocabulary but fails to use it in the absence of overt prompts delivered by an interventionist or communicative partner (Carr & Kologinsky, 1983; Charlop, Schreibman, & Thibodeau, 1985; Gobbi, Cipani, Hudson, & LaPenta-Neudeck, 1986).

Within recent years, variables that may influence the likelihood of a learner producing a communicative initiation have been identified. For example, Carr and Kologinsky (1983) demonstrated that, for some learners to initiate an object request, the item had to be visible. They implemented procedures to ensure predictable conditions when the objects would be available but not visible. Their intervention resulted in an increase in the learner's rate and variety of initiated requests. Other investigators -- including Charlop, Schreibman, and Thibodeau (1985); Gobbi, Cipani, Hudson, and LaPenta-Neudeck (1986); and Halle, Baer, and Spradlin (1981) -- have reported the successful use of procedures that incorporated the use of time-delay prompt fading to establish communicative initiations.

Relatively limited attention has been given to efficient strategies to establish communicative initiations during the earliest phases of the intervention process. This is a particularly important need, given the overwhelming consensus that persons with severe disabilities seem to more readily fill the role of responder than initiator in social exchanges.

Terminating communicative interactions. Table 5 displays a range of motivations for terminating an interaction. There exists a propensity in the literature to limit conversational terminating strategies to teaching examples in which the learner is highly motivated to escape the presentation of an undesired item or to escape an interaction that has become uninteresting. Unfortunately, these instances represent a narrowed sampling of the potential instances in which a conversational terminating function could be used. Recent research (e.g., Reichle, 1990a) suggests that learners who are taught to terminate an interaction when presented with highly nonpreferred items or events fail to generalize the use of their communicative strategy in the presence of items that are preferred but for which the learners have entered a state of satiation. Typically, strategies used to terminate interactions focus on identifying the most nonpreferred situations as the intervention stimuli. However, many opportunities to emit communicative rejects may involve events that are not particularly aversive to the learner. We believe that, with learners who exhibit the most severe disabilities, interventionists must carefully select a broad set of teaching examples that exemplify the full range of conditions under which a particular conversational function is to be used.

Table 5

Circumstances That May Occasion Termination of Communicative Interactions

Circumstance	Example
Ending undesired interactions	A learner becomes bored participating in a game of cards and says, "Let's stop."
Concluding desirable interactions in order to accommodate a schedule	When the bell rings in the school cafeteria, a learner may have to terminate her lunchtime interaction with a peer in order to avoid being late to her next class.
Finishing pleasant interactions to take advantage of a more attractive alternative	A 7-year-old child may be content to play with a 3-year-old child, provided no other playmates are available. However, the appearance of another 7-year-old may result in the interaction with the 3-year-old being terminated.
Discontinuing pleasant interactions due to environmental disruptions	A learner who sees his little brother fall off his bike may need to terminate a play activity in order to render assistance.

Note: From Reichle, J., York, J., and Sigafoos, J. (1991). *Implementing augmentative and alternative communication: Strategies for learners with severe disabilities* (p. 150). Baltimore: Paul H. Brookes. Copyright 1991 by Paul H. Brookes Publishing Company, Inc. Reprinted with permission. (Available from Paul H. Brookes Publishing Company, P.O. Box 10624, Baltimore, MD 21285-0624. Telephone: 1-800-638-3775.)

MODIFYING ELEMENTS OF ENVIRONMENTS TO ENSURE COMMUNICATIVE ATTEMPTS

Although the goal of communication intervention is for the learner to acquire the skills required to take advantage of natural communicative environments, it may be difficult for learners with severe and profound disabilities to take advantage of communicative opportunities without some modification or rearrangement of the schedule of certain events. For learners who are served in regular educational settings, some of the modifications required may involve extensive efforts to provide training, technical assistance, and program ownership to regular educators.

Influence of the Learner's State

It is clear that learners vary in their attentiveness to environmental stimuli. Historically, the term *behavioral state* has been used to refer to the various behavioral and physiological conditions through which infants continuously pass (Wolff, 1959). Consider, for example, how behavior state may affect an infant's response to the presentation of a bottle filled with milk. If an infant is crying and agitated, he may not immediately attend to the presentation of the bottle as a stimulus and, therefore, not respond accordingly (reach for the bottle and begin sucking). However, if an infant is awake and relatively quiet, he is likely to immediately attend to the bottle and initiate the appropriate response. Because the behavior state of being awake, quiet, and calm with minimal gross movements interferes the *least* with the ability to process various stimuli, it is posited that it is the optimal state for learning (Prechtl, 1974). Some general conclusions regarding behavior state that can be drawn from numerous investigations are presented in Table 6.

Behavior state in infants has been examined primarily among normally developing infants (Prechtl, 1974; Wolff, 1959, 1966). Colombo and Horowitz (1987) raised the intriguing question of whether the conclusions drawn from the infant literature on behavior state conditions are applicable to older persons with severe to profound disabilities who have developmental ages similar to that of infants. Simeonsson, Huntington, and Parse (1980) noted that determining the degree to which behavior states in individuals with profound mental retardation are predictable and regular may provide important information for the interventionist.

To date, there is limited empirical information on the behavior state characteristics of individuals with profound disabilities (Guess, Mulligan-Ault, et al., 1988; Guess, Siegel-Causey, et al., 1990; Guess, Roberts, et al., 1991). Guess, Mulligan-Ault, et al. (1988) found that, among 21 students with severe to profound handicaps, the percentage of time spent in an awake-inactive-alert state (state more conducive to learning) ranged from 23.88 to 71.85, with a mean of 46%. Results from Guess, Siegel-Causey, et al. (1990) and Guess, Roberts, et al. (1991) suggest that: (a) sometimes it is possible to predict that one particular behavior

Table 6

General Conclusions Regarding Behavior State in Infants

General Conclusions	Reference
There is a succession of behavior patterns (states) that is similar in all normally developing infants.	Wolff (1959) Wolff (1966)
Environmental variables (temperature, noise) can effect the duration and the stability of state cycles.	Wolff (1966)
Infants with unstable state patterns in the first weeks of life appear to be at risk for later, rather severe medical problems.	Tynan (1986) Thoman, Denenberg, Sievel, Zeidner, and Becker (1981)
Children recovering from brain injury follow a general pattern of recovery similar in many ways to the behavioral state cycles of infants.	Thompson (1984) Bagnato and Neisworth (1986)
Premature infants, infants with Down syndrome, and infants of mothers who are alcohol-addicted have shown behavioral state patterns that are different from those of normally developing infants.	Prechtl (1974)
Aberrations in state cycles are viewed as symptomatic of neurological disorganization that might result in reduced opportunities to learn, as well as diminished control over stimuli.	Horowitz (1980) Rainforth (1982)

state would follow another; (b) there appear to be no temporal cycle patterns for any of the subjects regarding any of the behavior state conditions; (c) there is a tendency to change from one behavior state to another in a relatively short period of time (e.g., 21-32 seconds); and (d) there appear to be strong associations between several behavior state conditions and critical environmental variable combinations (e.g., deep sleep was associated with variable combinations that included no interaction with the student and a prone or sidelying position).

These findings would suggest that it may be particularly important to identify setting variables that may be associated with a critical "window" of intervention opportunity with learners who are in an alert state for limited periods of time. Currently, there is a need to conduct empirical investigations to determine the effect that state conditions have on the individuals who interact with students with profound mental retardation and to identify the environmental variables that might alter the state conditions of these individuals.

COLLABORATIVE SERVICE DELIVERY

Ensuring That Professionals Clearly Understand Their Roles and Are Adequately Trained

Best practice in communication intervention suggests that instruction should occur in situations in which the behavior is eventually expected to be produced. With persons who have very severe disabilities, we know that a relatively large number of functional teaching opportunities may be required to establish new communicative behavior. Logistically speaking, communication interventionists must include parents, teachers, psychologists, teaching assistants, physical/occupational therapists, and a host of other professionals who regularly come in contact with the learner. Consequently, a tremendous level of collaboration across members of a learner's educational team is required if qualitatively adequate instruction is to occur.

In order to serve students in increasingly inclusive settings, professionals have begun to find it advantageous to reorganize service delivery to maximize the use of a collaborative model of service delivery emphasizing integrated therapy practices (Rainforth, York, & Macdonald, 1992). This emphasis on transdisciplinary collaboration in serving children and youth in inclusive educational settings has presented tremendous challenges to higher education to alter its traditional discipline-specific preservice training.

Defining Collaborative Teams

Rainforth, York, and Macdonald (1992) have defined a collaborative team as a group of members who labor together, with each team member contributing his or her knowledge and skills and having equal status as a member of the team. One hallmark of collaborative teams is a transdisciplinary approach to service delivery in which members of transdisciplinary teams:

1. share general discipline-specific information,
2. provide in-depth content background for fellow team members, and
3. prepare their fellow team members to share in the implementation of what have traditionally been discipline-specific instructional objectives.

As a result of these practices, collaborative teams embrace the active utilization of an integrated therapy model (Albano, Cox, York, & York, 1981; Giangreco, York, & York, 1989), in which the team as a whole identifies relative environmental content in which to use a learner's emerging skills and focuses on strategies to influence therapy objectives in regular curricular areas. Implementing collaborative teams and a corresponding integrated therapy model requires care if the outcome is to be qualitatively adequate (see Utley, this volume).

Advantages of a Collaborative Model of Service Delivery

Rainforth, York, and Macdonald (1992) describe a number of benefits of a collaborative transdisciplinary service delivery model. These benefits include: (a) increased instructional time for students with severe disabilities (Albano, 1983; McCormick, Cooper, & Goldman, 1979); (b) improved skill acquisition (Campbell, McInerney, & Cooper, 1984; Giangreco, 1986); (c) decreased passive caregiving in regular educational environments; and (d) reduced conflicts among team members (York & Rainforth, 1987).

Within the past several years, a number of professional organizations (e.g., the Division of Early Childhood, the American Occupational Therapy Association, the Association for Persons With Severe Handicaps, the American Physical Therapy Association, and the International Society of Augmentative and Alternative Communication) have endorsed policies promoting collaborative teaming and an integrated therapy model of service delivery. Each of these organizations has cited learning characteristics of students with severe disabilities, the benefits of collaboration, and existing legal mandates and precedents as a strong foundation for adopting less discipline-specific service delivery.

Training for Collaboration

Establishing a successful inclusive education for all students with disabilities will require overcoming two distinctly different, yet highly interrelated challenges. On one hand, existing discipline-specific preservice training does not allow sufficient modeling of a transdisciplinary approach to service delivery, which clearly represents best practice. Correspondingly, preservice trainers do not collaborate sufficiently with service providers in applied settings to develop the collaboration required to establish a continuum that bridges pre-service and inservice activities.

From a process perspective, preservice providers appear to be failing to carefully analyze the skills that will be needed in the environments in which professionals perform, nor are they addressing

these skills via competencies in preservice training programs. We believe that higher education preservice training must also adopt a strategy in which the training of professionals becomes a collaborative effort with the public school community and a transdisciplinary effort with academic units within universities. In order to achieve this objective, it is important that both public schools and university preservice programs collaborate in a manner that is mutually beneficial. We believe that one reasonable approach to a mutually beneficial relationship is the increasing involvement of public schools in preservice instruction and commensurate, increasing involvement of university preservice programs in inservice activities of the public schools.

The federal mandates to serve children in the least restrictive environment, regardless of age or handicapping conditions, have created a critical need to develop preservice training activities that focus on *transdisciplinary* intervention for children, particularly infants with disabilities and their families. Courtnage and Smith-Davis (1987) reported that, of the 360 higher education institutions that participated in their investigation, 48% offered absolutely no training in team collaboration. Rainforth (1985) conducted a nationwide survey of 53 university programs in order to evaluate the degree of interdepartmental coordination in the preservice preparation of students for work with persons having severe disabilities. She reported only 3 instances of any transdisciplinary pre-service activities. Results of this survey are particularly alarming when one considers that, as these students complete their professional training, they will be expected to work collaboratively with other professionals in public schools. Rainforth's (1985) study suggests that there are few instances in which higher education has met the challenge of delivering content information in a manner that also teaches students the collaborative skills that will be necessary in applied school settings. Among the most frequently cited stumbling blocks to the implementation of a collaborative model of personnel preparation are: (a) confusions regarding responsibilities, (b) absence of administrative support and structure, and (c) turfism regarding the ownership of courses within departments. The lack of preservice collaboration inevitably leads to a lack of collaboration among professionals serving children in public schools (Campbell, 1987). Baumgart and Ferguson (1991) conclude that the collaborative process is "...judged as valid and beneficial by parents and professionals (but) is not extensively practiced in either the service provider or the preservice arena..." (pg. 319).

Baumgart and Ferguson (1991) have emphasized the importance of refocusing university preservice instruction to place greater emphasis on team collaboration and the use of on-site team problem-solving. In placing increasingly greater emphasis on applied experiences, it will be increasingly necessary to ensure that practica are not simply "practicing labs" but, rather, collaborative instructional settings in which the practicum student is given sufficient support to approximate a more error-free (versus trial and error) learning environment.

Consequently, preservice students will require far greater support than they currently receive in most preservice training programs. In an existing environment of fiscal restraint in higher education, it is clear that collaborative supervision that involves the joint effort of academic faculty and practicing professionals in the field must be provided. If this is to occur, there must be clear advantages for practicing professionals to provide this engagement. There must also be active collaborative interaction between university faculty/staff and service providers to ensure that public school professionals are in a position to provide a strong collaborative arrangement.

Giangreco and Putnam (1992) have described a number of areas requiring careful scrutiny. These areas relate to the processes of collateral teaming, integrated therapy, and resulting inclusionary educational practices. First, even though there is a modest and growing database attesting to the value of an inclusionary model of education, there is a need to quantitatively and qualitatively examine the components of full inclusionary models on the academic, social, and interpersonal relationships that emerge in both children with disabilities and their peers. Secondly, for students who receive inclusive education, there is a continuing need to create and validate innovative approaches that ensure intensive skill instruction that does not sacrifice regular classroom inclusion and the corresponding social experiences. Thirdly, there is a need to scrutinize best practices used in implementing overlapping curricular objectives, using intervention approaches (such as cooperative learning) that, validated in regular education, have only just begun to receive significant attention as viable strategies for persons with significant disabilities. Fourthly, there is a tremendous need to examine collateral effects that the implementation of individualized instructional objectives may have on the learner's overall ability to function in a regular school environment. For example, as Giangreco and Putnam (1992) have pointed out, we have little empirical data addressing how learning a particular skill (e.g., playing with an age-appropriate toy) may be directly related to a different positive learner outcome (e.g., increased operative participation with a nondisabled peer). If we are to make significant headway in inclusive education, collateral effects must come to be viewed as empirically-predicted outcomes, rather than as some phenomenon that the interventionist hopes for after intervention.

Perhaps one of the most pressing areas for empirical scrutiny involves identifying and validating systems-change strategies to assist professionals in working collaboratively toward successful inclusive education for all individuals. This particular area of scrutiny requires a careful coordination of researchers in the areas of policy and personnel preparation.

Including Peers in Communication Intervention

Among even the most interactive and incidental intervention strategies, the bulk of instructional opportunities occurs in response to prompts or cues that have been teacher-arranged. A number of investigators (see Goldstein & Kaczmarek, 1992, for review) have suggested that a

variety of strategies can be directed at peers of learners with severe disabilities to increase the probability that social/communicative interactions will occur. Goldstein and Kaczmarek (1992) suggest that providing quality peer responsiveness to learners with disabilities may provide a context more conducive to learning social and communication skills. However, they also suggest that peer intervention is not well suited to learning new skills. This latter observation presents formidable challenges to interventionists and creates a clear need to merge data derived from communication research with the empirical literature addressing intervention strategies to achieve inclusion.

Addressing the Differences and Similarities Between Home and School

Traditionally, the assumption seems to have been that communication skills established at school would be useful at home and vice versa. Although it would make the intervention process much simpler, this may not be the case. For example, if a learner wants a beverage at home, he may go to the refrigerator and get one. At school, however, obtaining a beverage may require a permission request. The vocabulary and, to some degree, the communicative functions most apt to be expressed may differ tremendously across environments. Rather than always viewing skills taught in one setting as needing to be generalized across environments, interventionists may wish to consider the environments as settings calling for potentially different communicative responses. During the early phases of intervention, an important consideration may be selecting some communicative responses that will be appropriate and frequently used across settings. This may be important to create a greater number of acquisition opportunities. At the same time, it may assist in the fostering of teamwork among professionals and parents across settings.

SUMMARY

Traditionally, communication interventionists focused on teaching a beginning repertoire of communicative behavior, once learners with severe to profound disabilities had emitted intentional behavior. Increasingly, interventionists are recognizing that valuable opportunities may be lost if intervention does not begin at an earlier point. In part, intervention strategies at increasingly earlier points have resulted from a prevailing change from semantically-focused intervention logic to pragmatic, interaction-focused intervention logic.

At the same time that intervention content has increasingly focused on pragmatics, there has been a wealth of information addressing the social functions served by repertoires of simple idiosyncratic (as well as socially unacceptable) behavior. The increasing availability of augmentative and alternative communicative options has provided an extensive array of motorically simple strategies to exert significant control and influence over one's environment.

We have long since passed the need to demonstrate that persons with severe disabilities can be taught a reper-

toire of communicative functions. However, we have not been as successful in demonstrating that the communicative behavior taught is well maintained solely in the presence of natural maintaining contingencies. Nor have we adequately demonstrated that established repertoires are sufficiently generalized.

Most recently, interventionists have begun to focus on more efficient strategies to use and on selecting the most critical teaching instances to use. Additionally, interventionists are considering response efficiency as an important variable in determining the likelihood that a learner will choose to emit elements of his or her communicative repertoire.

There appears to be a consensus among those who currently serve individuals with severe disabilities that inclusion represents an attainable objective for students with even the most severe disabilities. Unfortunately, it is not clear that either special or regular educators are being adequately prepared to accomplish included placements. There remains a significant need to recognize those aspects of best practice which must be further explored in regular education settings. What once were considered best practice methods may not meet the test of social validity and be considered best practices in regular classrooms.

The vast majority of intervention research has selected a fairly narrow communicative form or function to teach. Increasingly, information on maintenance and generalization is considered. However, often the periods sampled post-acquisition are very modest. Among the plethora of available communication intervention curricula, there are virtually none that have taken a learner from a point of engaging in no intentional communicative behavior to the establishment of an effusive repertoire of communicative functions and corresponding vocabulary.

There is a critical need for longitudinal efforts to validate curricula being developed for persons with severe to profound disabilities. Although important, it is no longer sufficient to demonstrate that repertoires selected for instruction have social validity at the point in time they were implemented. Increasingly, it is important to address how initial intervention decisions influence later intervention decisions. Only when this is scrutinized systematically will our intervention strategies become sufficiently streamlined.

To be able to express oneself has long been viewed as a cherished right. Many individuals with severe to profound disabilities have not been afforded this right, although not maliciously. Fortunately, our ignorance regarding strategies that allow learners to take advantage of opportunities is diminishing. Slowly, but persistently, interventionists are moving toward functional approaches that are assisting individuals with severe disabilities to exercise their right of free speech.

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Closing the Gap. Bimonthly newspaper. Address correspondence to: Closing The Gap, P.O. Box 68, Henderson, MN 56044. Or call (612) 248-3294.

Journal of Applied Behavior Analysis (JABA) (ISSN 0021-8855). Published quarterly by the Society for the Experimental Analysis of Behavior, Inc. Address correspondence to: Business Manager, Mary Louise Wright, Dept. of Human Development, University of Kansas, Lawrence, KS 66045.

Journal of Child Language. Send correspondence to: Cambridge University Press, 40 W. 20th Street, New York 10011.

Journal of Speech and Hearing Research (JSHR) (ISSN 0022-4685). Published bimonthly by the American Speech-Language-Hearing Association, 10801 Rockville Pike, Rockville, MD 20852-3279. Telephone: (301) 897-5700.

The Journal of the Association for Persons with Severe Handicaps (JASH) (ISSN 0274-9483). Published quarterly by The Association for Persons with Severe Handicaps, 11201 Greenwood Avenue N., Seattle, Washington 98133. Telephone: (206) 361-8870.

Mental Retardation. Send correspondence to: American Association on Mental Retardation, 1719 Kalorama Road N. W., Washington D.C. 20009. Telephone: (202) 387-1968.

Topics in Early Childhood Special Education. Address correspondence to: Pro-Ed Incorporated, 8700 Shoal Creek Blvd., Austin, TX 78758-6897. Telephone: (512) 451-3246.

Organizations

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The Society for the Experimental Analysis of Behavior, Inc., Business Manager, Mary Louise Wright, Dept. of Human Development, University of Kansas, Lawrence, KS 660452.

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Enhancing Conversation Skills with Assistive Technology
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Functional Communication Training Using an Augmentative Communication System
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Validating Strategies that Facilitate Spontaneous Communication and Extend Pragmatic Functions for Learners with Severe Disabilities
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Training of Educators of Students with Multiple Disabilities that Include Auditory and Visual Impairments: AFB Deaf-Blind Project
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Applications of Technology in the Early Communication Training of Children with Deaf-Blindness
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Utilization of Innovative Practices in Communication Treatment for Students with Severe Disabilities
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A Comprehensive Model to Enhance the Master and Functional Capabilities of Students with Multiple and Physical Disabilities

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Facilitating Adaptations in Family-Routine Interactions: For Infants/Young Children with Dual Sensory Impairments and Their Families

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Integrating Related Services into Instructional Objectives

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Issues Related to Inclusion

Utilization of Best Practices in Transition for Students with Deaf-Blindness
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Project Eyes and Ears
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Including Exceptions: A System for Educating Students with Dual Sensory Impairments and Other Extreme Disabilities in General Education Settings
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Project LIFE (Lifelong Impact From Education)
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Innovations for Educating Children with Deaf-Blindness in General Education Settings: Friends for Life
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Systematic Integrated Preschool Model for Children with Severe Disabilities
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Developing Social Relationships between Students with Severe Intellectual Disabilities and Nondisabled Peers and Others
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Kansas Project for the Utilization of Full Inclusion: Innovations for Students with Severe Disabilities
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Regular Class Participation System: Ongoing Support for Students with Severe Disabilities
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Integrated Social and Leisure Recreation for Students with Severe Disabilities
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Application of Technology to Enhance Quality of Life: A Multidisciplinary Consortium Approach
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Inclusive Education Project: A Building-Based Approach to Developing Classroom and School Models that Include Students with Severe Disabilities
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Using a Collaborative Problem Solving Strategy to Facilitate the Mainstreaming of Students with Severe Disabilities

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Attachment A

Taxonomies Describing
Instrumental Communicative Intents

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Taxonomies Describing Instrumental Communicative Intents

Wetherby & Prizant (1989)	Cirrin & Rowland (1985)	McLean & Snyder-McLean (1991)	Coggins & Carpenter (1978)	Dore (1975)
Comment on Object: Acts used to direct another's attention to an entity.	Direct Attention to Object: Direction of listener's attention to an external, observable referent, or some object identified by the child. This includes the speaker taking notice of an object or labeling an object in absence of a request.	Request Attention to Other: Behavior used to direct the communicative partner's attention to some object, person (other than self), event, or state of affairs.	-------	-------
----------	----------	----------	Transferring: Gestures intended to place an object in another person's possession.	----------
----------	----------	----------	----------	Labeling: Uses word while attending to object or event. Does not address adult or wait for response.
Comment on Action: Acts used to direct another's attention to an event.	Direct Attention to Action: Direction of listener's attention to an ongoing action or event in the environment. Focus may be the movement or action of an object rather than the object itself. A "comment" on some ongoing activity.	(Refer to Request Attention to Other)	----------	----------

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Wetherby & Prizant (1989)	Cirrin & Rowland (1985)	McLean & Snyder-McLean (1991)	Coggins & Carpenter (1978)	Dore (1975)
Show Off: Acts used to attract another's attention to oneself.	Direct Attention to Self: Direction of listener's attention to the child as a general attention-getter for some unspecified social purpose.	Request Attention to Self: Behavior used to attract attention to oneself. No other referent is indicated.	Showing Off: Gestures or utterances that appear to be used to attract attention.	----------
Call: Acts used to gain the attention of others, usually to indicate that a communicative act is to follow.	Direct Attention to Communication: Direction of listener's attention to self as a preface to another communicative behavior that follows immediately.	(Refer to Request Attention to Self)	(Refer to Showing Off)	Calling: Calls adult's name loudly and awaits response.
Acknowledgement: Acts used to indicate notice of another person's previous statement or utterance.	----------	----------	Acknowledging: Gestures or utterances that provide notice that the listener's previous utterances were received.	----------
----------	Answer: A communicative response from a child to a request for information from the adult listener. This typically takes the form of indicating a choice or answering a question.	----------	Answering: Gestures or utterances from the child in response to a request for information from the listener.	Answering: Answers adult's question. Addresses adult.
Clarification: Acts used to clarify the previous utterance.	----------	----------	----------	----------
Request Object: Acts used to demand a desired tangible object.	Request Object: Seeks the receipt of a specific object from the listener where the child awaits a response. The object may be out of reach due to some physical barrier.	Request Object: Behavior used to request an object. Interest is on the object desired.	Request Object: Gestures or utterances that direct the listener to provide some object for the child.	Requesting: Asks question with a word, sometimes accompanying gesture. Addresses adult and awaits response.

Wetherby & Prizant (1989)	Cirrin & Rowland (1985)	McLean & Snyder-McLean (1991)	Coggins & Carpenter (1978)	Dore (1975)
Request Action: Actsused to command another to carry out an action.	Request Action: Seeks the performance of an action by the listener where the child awaits a response. The child may specify the action (e.g., "sit") or the child's immediately preceding behavior give evidence that he realizes that some action is a necessary step to obtaining some object (e.g., signaling "help" to open a jar.)	Request Instrumental Action: Behavior used to direct a communicative partner to carry out action facilitating access to an object or attainment of a desired effect.	Requesting Action: Gestures or utterances that direct the listener to act upon some object in order to make it move. The action, rather than the object, is the focus of the child's interest.	Requesting Action: Word or vocalization often accompanied by gesture signaling demand. Addresses adult awaits response.
Request Information: Acts used to seek information, explanation, or clarification about an object, event, or previous utterance. Includes wh- questions and other utterances having the intonation contour of an interrogative.	Request Information: Seeks information, approval, or permission from listener, where the child awaits a response. This includes directing the listner to provide specific information about an object, action , or location.	Request Information/ Feedback: Behavior used to direct the communicative partner to provide information about an object, action, or location; to request approval/nonapproval, permission, or affirmation.	Requesting Information: Gestures or utterances that direct the listener to provide information about an object, action, or location.	----------
Request Permission: Acts used to seek another's consent or carry out an action; involves the child carrying out or wishing to carry out the action.	(Refer to Request Information)	(Refer to Request Information/Feedback)	----------	----------
Request Social Routine: Acts used to command another to commence or continue carrying out a game-like social interaction.	(Refer to Request Action)	Request Noninstrumental Action: Behavior used to direct a communicative partner's action. Goal is to instigate other's actions rather than to obtain an object or effect.	----------	----------

Wetherby & Prizant (1989)	Cirrin & Rowland (1985)	McLean & Snyder-McLean (1991)	Coggins & Carpenter (1978)	Dore (1975)
Protest: Acts used to refuse an undesired object or to command another to cease an undesired action.	.....	Request Cessation/Reject/Avoid: Behavior used to request a communicative partner to cease an undesired action or activity or to reject an offered object or anticipated event.	.....	Protesting: Resists adult's action with word or cry. Addresses adult.
Greet: Acts used to gain another's attention to indicate notice of their presence, or to indicate notice of the initiation or termination of an interaction.	.....	.....	Greeting: Gestures or utterances subsequent to a person's entrance that express recognition.	Greeting: Greets adult or objects upon its appearance.
.....	.....	.....	.....	Repeating: Repeats part or all of prior adult utterance. Does not wait for a response.
.....	.....	.....	.....	Practicing: Use of word or prosodic pattern in absence of any specific object or event. Does not address adult. Does not await response.

Note: A dashed line on the matrix indicates that a similar intent did not exist in that particular taxonomy.

Note: From Reichle, J., Halle, J., & Johnston, S. (1993). Developing an initial communicative repertoire: Applications and issues for persons with severe disabilities. In A.P. Kaiser & D.B. Gray (Eds.). (1993). Enhancing children's communication: Research foundations for intervention (pp. 110-114). Baltimore, MD: Paul H. Brookes Publishing Company. Reprinted with permission. (Available from Paul H. Brookes Publishing Company, P.O. Box 10624, Baltimore, MD 21285-0624. Telephone: 1-800-638-3775.)

Attachment B

Illustrating the Six Steps of

General Case Instruction

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General Case Instruction

1. Define instructional universe. It is during this step that the interventionist determines all of the stimulus conditions in which it would be appropriate to emit the target response, as well as the stimulus conditions in which it is not appropriate to emit the target response but which might be easily confused with conditions in which the behavior should be emitted.

2. Define the range of relevant stimuli and response variation within that universe. After the interventionist determines the stimulus conditions that comprise the instructional universe, it is necessary to determine the range of stimulus and response variability within that universe. In our example, the range of relevant stimuli variation would include variability in the containers that the milk is presented (e.g., glasses, cups, cartons), as well as variability in the settings and the people present. The range of relevant response variation would include the variability in the responses that need to be performed (e.g., response needed to access the symbol when the wallet is closed, response needed to access the symbol when the wallet is open).

3. Select examples from the instructional universe for use in teaching and probe testing. The interventionist selects positive teaching examples (members of the stimulus class that should elicit a target response), as well as negative teaching examples (members of the instructional universe which should not elicit the target response) for use in teaching and in probe testing. In teaching a learner to request milk, the interventionist would delineate specific situations where it is appropriate to request milk (e.g., in the presence of cartons, cups, glasses, milk), as well as situations where it is not appropriate to request milk (e.g., when juice or soda is offered as the only available beverage).

4. Sequence teaching examples. The sequence in which positive and negative examples are presented can effect the efficiency of instruction. One strategy might involve the interventionist sequencing the teaching examples so that, at first, the positive and negative strategies that are taught are maximally different (e.g., they share no relevant characteristics). Then, as the intervention progresses, the number of relevant characteristics shared by the positive and negative examples increases until the examples are minimally different (e.g., the negative examples share all but one of the relevant features that define the stimulus class of positive examples). In our example, we might choose a carton of milk and a bottle of soda as our first positive and negative examples. Then, as the intervention progresses, we might choose a clear glass of milk and a clear glass of orange juice.

5. Teach the examples. Teaching the positive and negative examples is accomplished using instructional techniques that represent current best practices (e.g., prompting, reinforcing appropriate responses, etc.). For our learners, we might choose to implement a stimulus prompting procedure where we gradually fade in the distractor symbol (e.g., the bottle of soda).

6. Test with non-trained probe examples. The interventionist is able to assess generalization by periodically conducting probe tests using stimuli that are not used in the context of intervention. Probe testing allows the interventionist to assess whether or not the learner is responding appropriately across the range of stimulus and response variation. For example, on one occasion, we might select a cup of hot chocolate as a negative example. On another occasion, we might choose a juice box as a positive example.